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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/498,703	02/07/2000	Jahja I. Trisnadi	SLM-04300	9200

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EXAMINER
RODRIGUEZ, ARMANDO

ART UNIT	PAPER NUMBER
2828	

DATE MAILED: 05/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/498,703	TRISNADI, JAHJA I.
	Examiner	Art Unit
	Armando Rodriguez	2828

-- The MAILING DATE of this communication appears on the c ver sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 19-63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1,19-49 and 56-63* is/are allowed.

6)☒ Claim(s) *50-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

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Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *14* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 50-55 have been considered but are moot in view of the new ground(s) of rejection.

Examiner acknowledges applicant's amendment filed April 28, 2003 after final rejection, which has been entered.

Examiner withdraws Final Rejection mailed on February 28, 2003.

Regarding claims 1,19-49 and 56-63, after reviewing applicant's amendment and conducting an updated search the claims have been allowed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 50-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiiro (PN 5,404,365) in view of Florence (PN 5,313,479) and Tadic-Galeb et al (US 2001/0019454).

Regarding claims 50 and 55,

Hiiro illustrates in Fig. 1 an apparatus for combining polarized coherent light from lasers (M1-Mn) via beam splitters (P-Pn), where lasers (M1) and (M2) are combined having beams which orthogonal polarized with each other and create a third beam. It is well known in the art that illumination of coherent laser output on displays, surfaces or

screens cause interference patterns known as speckle. Thereby the combination of the coherent lasers of Hiiro will have such interference patterns.

Florence teaches of combining three coherent light sources (10, 12, 14) via beam splitters (16, 18, 20), where a diffuser (22) is disclosed for eliminating the speckle caused by the combined light sources, as illustrated in figure 1 and described in column 2.

Hiiro does not disclose the laser beam coupled to a depolarizing screen.

Florence does not disclose the laser beam coupled to a depolarizing screen.

Tadic-Galeb et al illustrates in figure 1 a projection lens system having a display screen (36). In paragraph (78) it is disclosed that a similar screen to screen (36) of figure 1, is illustrated in figure 20 as screen (268), which may be a diffusive screen or a diffuser. Thereby, as taught by Florence a diffuser will eliminate speckle caused by coherent light sources.

Therefore, it would have been obvious at the time the invention was made to provide the laser system of Florence with a diffusive instead of a rotating diffuser because it would provide a speckle-free image displayed on the screen.

Regarding claims 51 and 52,

The diffusive screen (268) of figure (20) provides transmission of the beam.

Furthermore, the above references disclose the claimed invention except for the arrangement of the diffusive screen being in a reflective mode. It would have been an obvious matter of design choice to arrange the diffusive screen in a reflective mode, since applicant has not disclosed that the reflective mode solves any stated problem or

is for any particular purpose and it appears that the invention would perform equally well in the transmission mode.

Regarding claims 54 and 55,

The above references disclose the claimed invention except for the combining means being a multiplayer dielectric device or a birefringent crystal . It would have been an obvious matter of design choice to arrange a multiplayer dielectric device or a birefringent crystal instead of a beam splitter as disclosed by Hiiro and Florence , since applicant has not disclosed that the multiplayer dielectric device or a birefringent crystal solve any stated problem or is for any particular purpose and it appears that the invention would perform equally with a multiplayer dielectric device or a birefringent crystal.

Allowable Subject Matter

Claims 1,19-49 and 56-63 are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding claim 1,

None of the cited prior arts alone or in combination discloses the claimed invention having the structural combination for reducing laser speckle as recited in independent claim 1, where a polarizing beam splitter configured to divide a first polarized laser output into a second polarized laser output and third polarized laser output, the first polarized laser output having a coherence length; a light guide comprising a polarization preserving fiber optic, the light guide configured to create an optical path difference between the second polarized laser output and the third

polarized laser output, the optical path difference being at least about the coherence length, the light guide being configured to direct the second polarized laser output to the polarizing beam splitter such that the polarizing beam splitter combines the second polarized laser output and the third polarized laser output into a fourth laser output and a depolarizing screen coupled to the fourth laser output, the fourth laser output illuminating the depolarizing screen.

Regarding claims 19-33,

None of the cited prior arts alone or in combination discloses the claimed invention having the structural combination for reducing laser speckle as recited in independent claim 19, where a polarizing beam splitter configured to divide a first polarized laser output into a second polarized laser output and third polarized laser output; a plurality of mirrors configured to create an optical path difference between the second polarized laser output and the third polarized laser output, the plurality of mirrors configured to direct the second polarized laser output to the polarizing beam splitter such that the polarizing beam splitter combines the second polarized laser output and the third polarized laser output into a fourth laser output; a piezoelectric transducer coupled to at least one of the mirrors, the piezoelectric transducer being driven by an electrical signal such that the optical path difference is varied by an amplitude, the amplitude being at least about a half wavelength of the polarized laser output, the electrical signal having an electrical signal frequency and a depolarizing screen coupled to the fourth laser output, the fourth laser output illuminating the depolarizing

screen, the electrical signal frequency being at least a sufficient frequency such that laser speckle is reduced.

Regarding claims 34-40,

None of the cited prior arts alone or in combination discloses the claimed invention having the structural combination for reducing laser speckle as recited in independent claim 34, having means for dividing a first polarized laser output into a second polarized laser output and third polarized laser output; the first polarized laser output having a coherence length; the second laser output and the third laser output having orthogonal polarizations and having intensities that are about equal; means for oscillating an optical path length of the second polarized laser output by an amplitude and with an oscillation frequency, the amplitude being at least about a half wavelength of the first polarized laser output; means for combining the second polarized laser output and the third polarized laser output into a fourth laser output and a depolarization screen coupled to the fourth laser output, the fourth laser output illuminating the depolarizing screen, the oscillation frequency being at least a sufficient frequency such that laser speckle is reduced.

Regarding claims 41-43,

None of the cited prior arts alone or in combination discloses the claimed invention having the method steps for reducing laser speckle with the steps for dividing a first polarized laser output into a second polarized laser output and third polarized laser output, the second laser output and the third laser output having orthogonal polarizations and having intensities that are about equal, oscillating an optical path

length of the second polarized laser output by an amplitude and with an oscillation frequency, the amplitude being at least about a half wavelength of the first polarized laser output, combining the second polarized laser output and the third polarized laser output into a fourth laser output and illuminating a depolarizing screen, the oscillation frequency being at least a sufficient frequency such that laser speckle is reduced.

Regarding claims 44-46,

None of the cited prior arts alone or in combination discloses the claimed invention having the structural combination for reducing laser speckle as recited in independent claim 44, having means for dividing a first polarized laser output into a second polarized laser output and third polarized laser output; the second laser output and the third laser output having orthogonal polarizations and having intensities that are about equal; means for switching between the a first optical path length and a second optical path length for the second polarized laser output, a difference between the first optical path length and the second optical path length being about an odd multiple of a half wavelength of the first polarized laser output; means for combining the second polarized laser output and the third polarized laser output into a fourth laser output, means for diverging the fourth laser output in a first direction to create a fifth laser output, a scanning mirror coupled to the fifth laser output, the scanning mirror reflecting the fifth laser output to create a line illumination, and a depolarizing screen illuminated by the line illumination, the scanning mirror repeatedly scanning the line illumination across a portion of the depolarizing screen such that the means for switching maintains the first optical path length for a first scan, switches to the second optical path length for

a second scan, and alternates between the first optical path length and the second optical path length for subsequent scans.

Regarding claims 47-49,

None of the cited prior arts alone or in combination discloses the claimed invention having the method steps for reducing laser speckle with the steps for dividing a first polarized laser output into a second polarized laser output and third polarized laser output; the second laser output and the third laser output having orthogonal polarizations and having intensities that are about equal; switching between the a first optical path length and a second optical path length for the second polarized laser output, a difference between the first optical path length and the second optical path length being about an odd multiple of a half wavelength of the first polarized laser output; combining the second polarized laser output and the third polarized laser output into a fourth laser output; diverging the fourth laser output in a first direction; scanning the fourth laser output in a second direction across a portion of a depolarizing screen in a first scan with the first optical path length, in a second scan with the second optical path length, and in subsequent scans alternating between the first optical path length and the second optical path length, the second direction being orthogonal to the first direction.

Regarding claims 56-58,

None of the cited prior arts alone or in combination discloses the claimed invention having the method steps for reducing laser speckle with the steps for combining a first polarized laser output and a second polarized laser output, the first

polarized laser output being incoherent with the second polarized laser output, the first polarized laser output and the second polarized laser output having orthogonal polarizations and illuminating a depolarizing screen coupled to the third laser output.

Regarding claims 59-61,

None of the cited prior arts alone or in combination discloses the claimed invention having the structural combination for reducing laser speckle as recited in independent claim 59, having means for rotating a polarization of a laser output, whereby a rotating polarization is formed, the rotating polarization being driven with a rotation frequency and a depolarization screen coupled to the laser output, the rotation frequency being sufficient to reduce laser speckle.

Regarding claim 62,

None of the cited prior arts alone or in combination discloses the claimed invention having the method steps for rotating a polarization of a laser output, whereby a rotating polarization is formed, the rotating polarization being driven with a rotation frequency and illuminating a depolarization screen coupled to the laser output, the rotation frequency being sufficient to reduce laser speckle.

Regarding claim 63,

None of the cited prior arts alone or in combination discloses the claimed invention having the structural combination for reducing laser speckle as recited in independent claim 63, having means for dividing a first polarized laser output into a second polarized laser output and third polarized laser output, the means for dividing comprising a polarizing beam splitter, the first polarized laser output having a coherence

length, the second polarized laser output and the third polarized laser output having orthogonal polarizations and having intensities that are about equal; a light guide comprising a polarization preserving fiber optic, the light guide coupled to the second polarized laser output, the light guide creating an optical path difference between the second polarized laser output and the third polarized laser output, the optical path difference being at least about the coherence length; means for combining the second polarized laser output and the third polarized laser output into a fourth laser output, the means for combining comprising the polarized beam splitter and a depolarizing screen coupled to the fourth laser output.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Armando Rodriguez whose telephone number is (703) 308-6218. The examiner can normally be reached on 10-hour day / M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-4881.

Armando Rodriguez
Examiner
Art Unit 2828

Paul Ip
Supervisor
Art Unit 2828

AR/PI
May 13, 2003